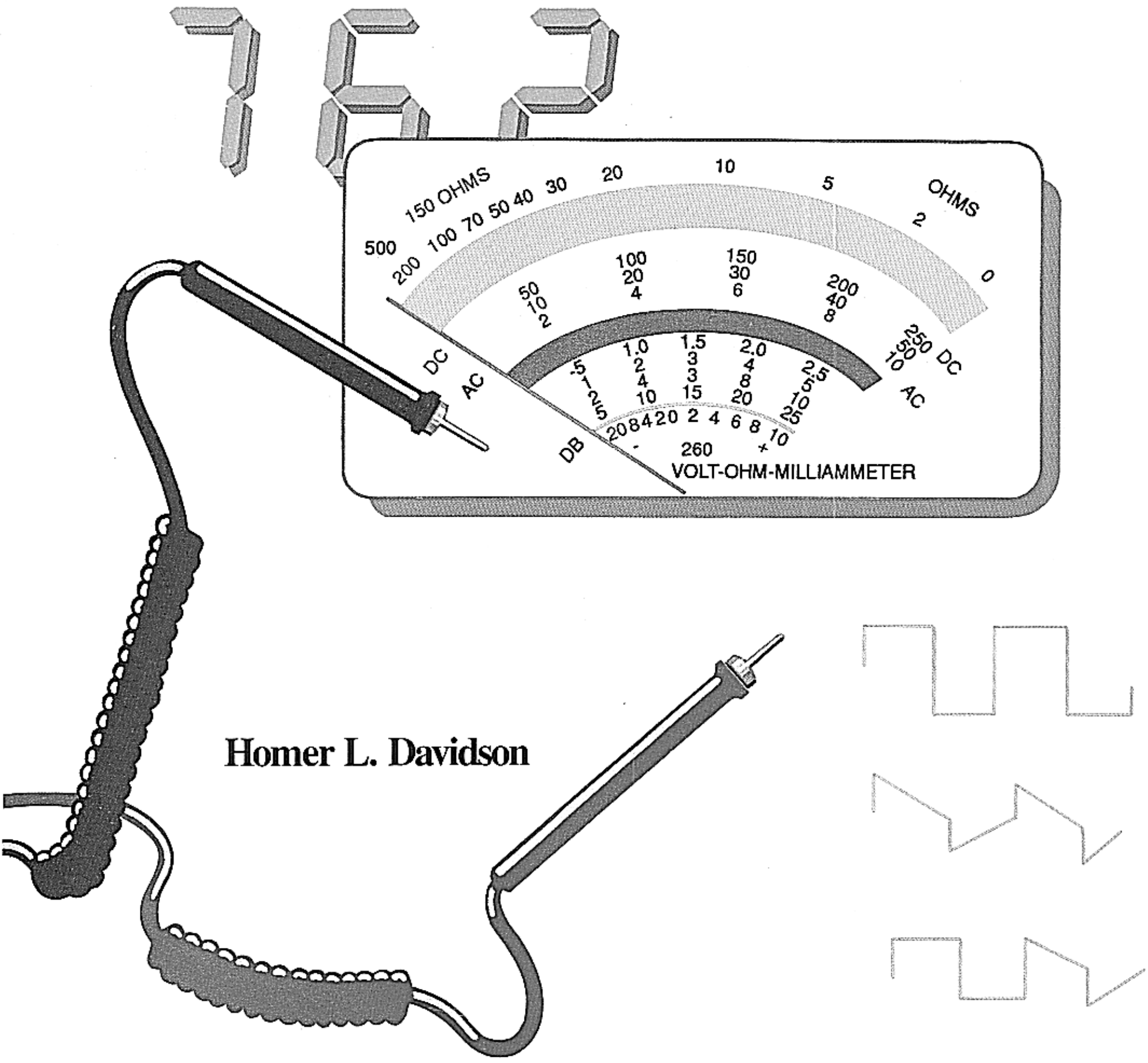
BUILD YOUR OWN TEST EQUIPMENT



Homer L. Davidson

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Introduction

Why should anyone try to build their own test instruments when so many commercial units are available? The answer is simple: to build test equipment that is not currently on the market, to learn how test instruments work, to locate defective circuits, and to save some money. Besides, it's fun. With a low-priced digital multimeter (DMM) and the test instruments in this book, you can service many different units in the entertainment field.

The 32 test instruments found in this book have actually been constructed, tested and placed in service. Some of the test instruments are very simple and can be built in one evening, and others might take a day or two to construct. The book shows how to build various test units used on the service bench by the electronic technician, the electronic activist, the beginner, and the homeowner.

Throughout the book are complete descriptions of how to connect wire, and solder each test instrument. It is very discouraging to work several hours on a project, only to find that it does not operate. Information about testing and servicing possible troubles and pitfalls is at the end of the text for each test instrument. The complete parts lists include exact part numbers, and where the critical parts can be found and ordered. Of course, some of these components might be found in your own electronic junk box.

The electronic technician uses many different test instruments to service amplifiers, cassette decks, CD players, camcorders, radio receivers, microwave ovens, and television sets. This book is divided to cover five different types of test equipment: that used by the novice, beginner, homeowner, electronic student, and electronic technician.

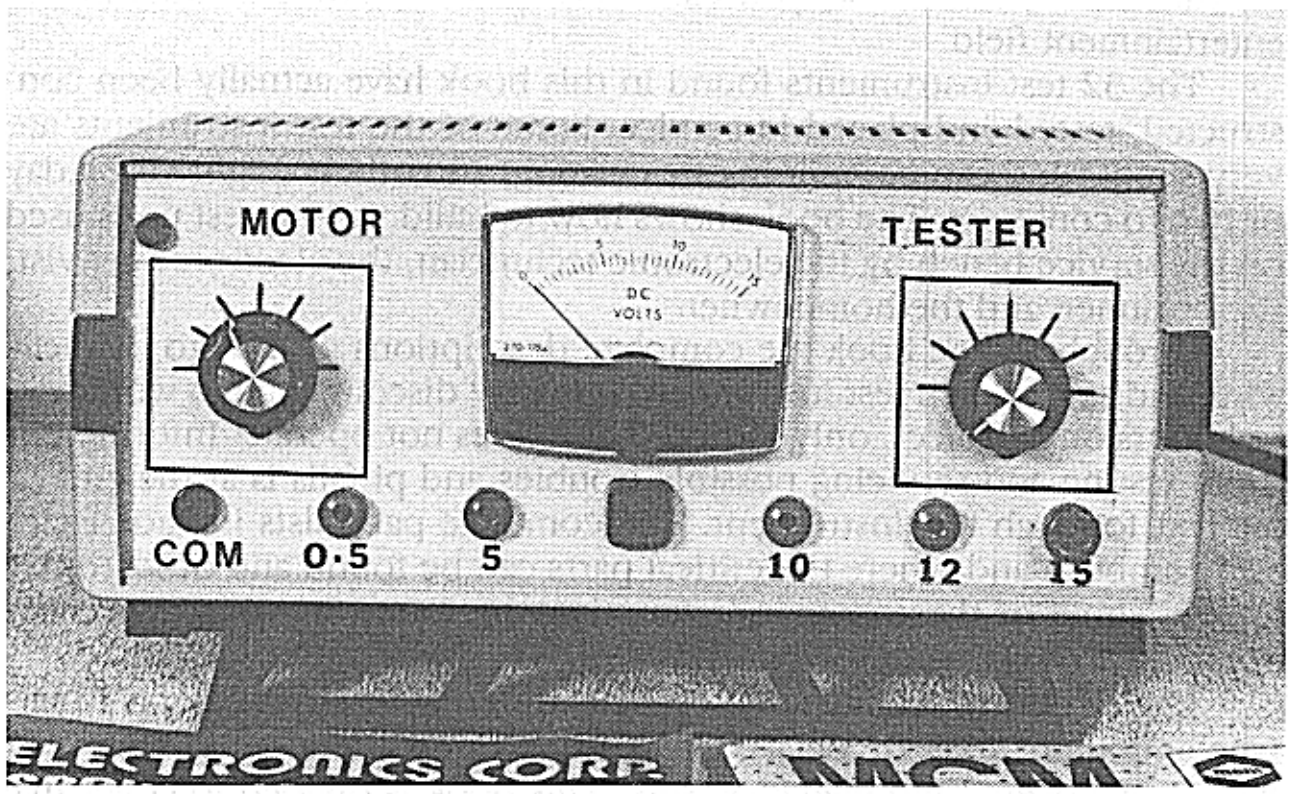
How to select the correct cabinet and chassis, and how to make perf and etched boards is covered in chapter 1. The project, the experimenter's powered breadboard, is a universal solderless breadboard upon which you can design and experiment with the various electronic circuits.

Seven simple test instruments that anyone can build are found in chapter 2. Although these test instruments are easy to construct, several might wind up on the electronic technician's test bench. The diode, light bulb, and fuse testers can be used in every home. The low-voltage motor tester can be used to locate the defective low-voltage toy motors or expensive CD and camcorder motors (FIG. I-1).

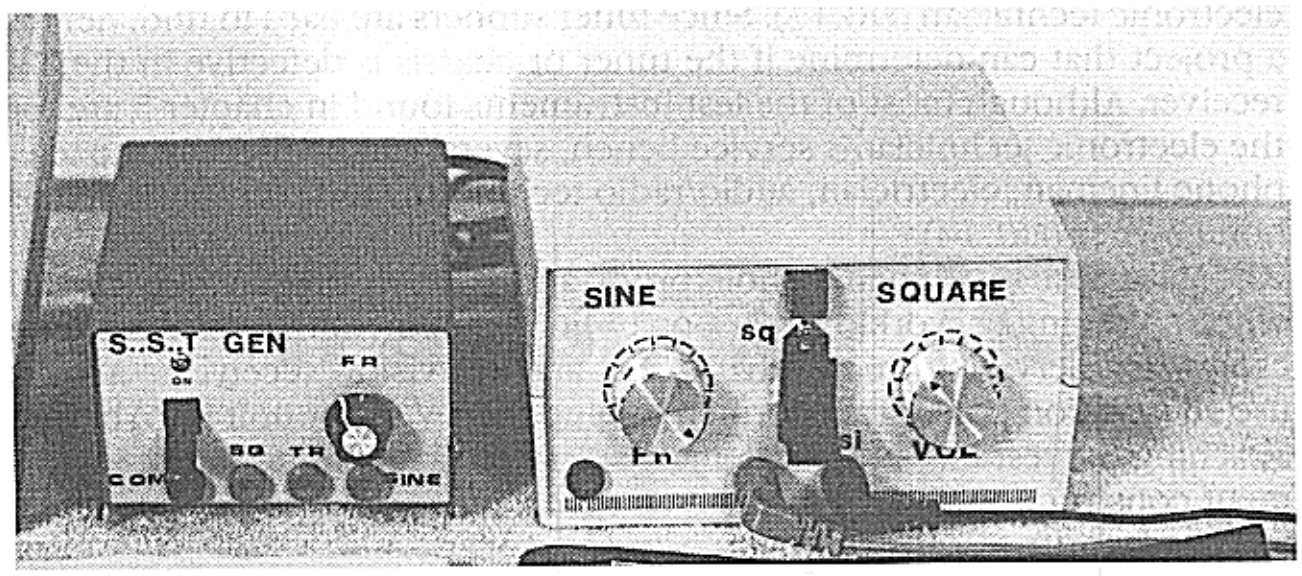
Chapter 3 provides instructions and data on how to build fine test instruments for the novice and beginner, starting with a transistor tester that connects to a regular DMM (digital multimeter). A diode/SCR/triac and continuity checker and noise generator should be found upon any test bench; both instruments can be built from information in this chapter.

Seven test instruments for the advanced or electronic enthusiast are included in chapter 4. The low-voltage power supply, audio amp checker, sine/square-wave generator, hand-held signal injector, and tracer are ideal test instruments to learn how to build and handy to have around when building projects (FIG. I-2). The radio amateur or electronic technician can use the crystal checker to locate defective crystals in ham gear or saw filters and crystals in the TV chassis.

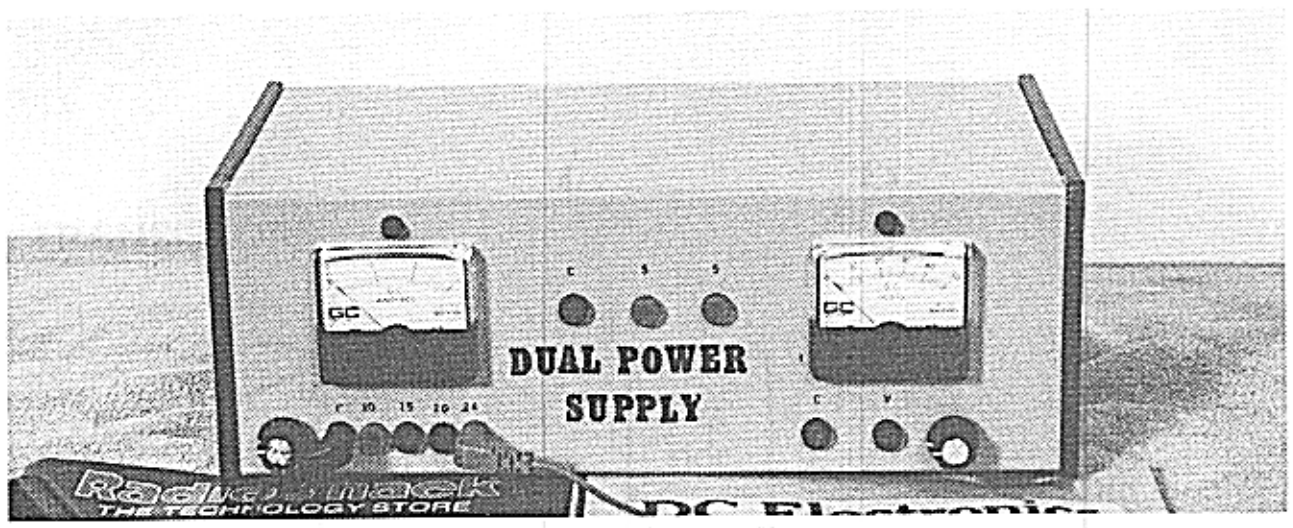
The laser/infrared CD diode checker, infrared remote-control tester, and deluxe duoregulated power supply can be used every week by the



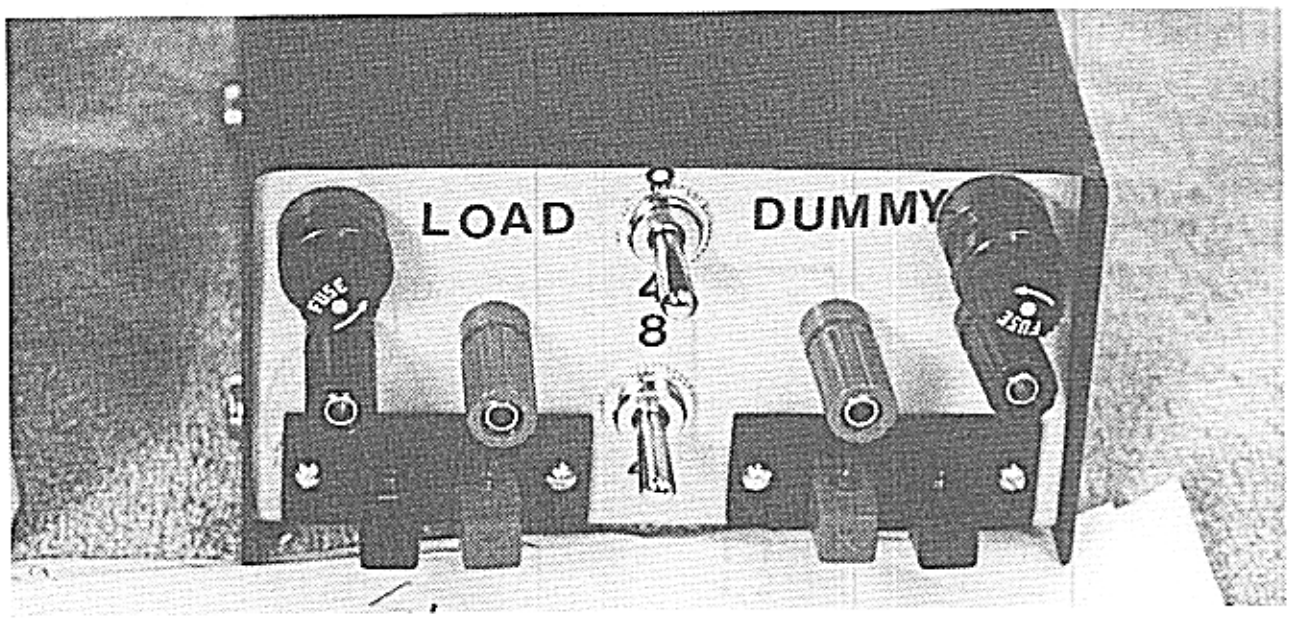
I-1 This deluxe motor tester has a 0 to 5-volt supply to test camcorder, CD, and battery motors. A fixed 5-, 10-, 12-, and 15-volt regulated power supply provides up to 2-amp operation for larger cassette, toy, and small dc motors.



I-2 Two sine and square waveform generator testers: one operates on batteries and the other is powered with an ac transformer.



I-3 This deluxe, dual-powered voltage supply has two separate voltage sources: a variable 1.2-to-27 volt, 1.5-amp regulated power supply, and four fixed voltage sources—10, 15, 20, and 24 volts dc.



I-4 This dummy load provides 4- and 8-ohm load with up to 100 watts of power for use when servicing stereo amps, large power amplifiers, or PA systems, for example.

electronic technician (FIG. I-3). Since tuner subbers are hard to find, here is a project that can determine if the tuner or chassis is defective in the TV receiver. Although most of the test instruments found in chapter 5 are for the electronic technician's service bench, several can be used by the telephone lineman, electrician, audio/radio technician, audio enthusiast, and homeowner (FIG. I-4).

Make test instruments shockproof and easy to operate. Be careful when soldering or working near power-line equipment. Exercise extreme care when servicing microwave ovens and television receivers. Always use an isolation power transformer, to plug the TV set or unit into, before attaching the test instrument. Remember, safety comes first in test-instrument construction. Do not use old ac cords or exposed power-line wires in your favorite test instruments.

Of course, not everyone will want to build every project in the book, but several of these test instruments are for everyone. Just select the test instrument you would like to build and get started.

Learn how to build and use instruments for troubleshooting:

- Televisions
- Stereos
- Computers
- Compact disc players
- Ham radios
- Microwave ovens
- Camcorders
- Electric motors
- Power supplies and cables

And much more!

Why build your own electronic test equipment?

Well, if you're a professional technician, it's a fun and relaxing way to practice your trade in the privacy of your own shop. If you're an ambitious hobbyist, it's an opportunity to sharpen old skills and learn exciting new ones while stocking your workbench with devices that will last for years. Whatever your level of expertise, building your own electronic test equipment is a great way to save money on the instruments you need and on the rising cost of household appliance repair.

Build Your Own Test Equipment tells you all there is to know about constructing inexpensive, high-capacity troubleshooting equipment for almost any purpose. Veteran electronics whiz Homer L. Davidson leads you step by step through the entire process:

- Finding and buying components
- Designing PC boards
- Substituting components
- Building and testing projects
- Putting your completed instruments to work

There are projects here for everyone, from the beginning experimenter to the seasoned professional—all accompanied by Davidson's simple, easy-to-follow instructions, photographs, and diagrams. Many of the instruments detailed here can be built by novices in one evening, while others require special skills and a few days of challenging work. Whichever units you choose to build, you're guaranteed equipment that's as good as or better than any on the market today—and at a fraction of the cost!

About the Author

Homer L. Davidson owned and operated a successful radio and TV repair business for 38 years before becoming a full-time writer of how-to electronics books. He is also a regular contributor to such magazines as *Electronic Servicing and Technology* and *Electronic Handbook*.

Other TAB books by Homer L. Davidson:

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